

REMARKS

Pursuant to the present amendment, claims 1, 4 and 22 have been amended, claims 16-20 have been canceled, and new claims 25-32 have been added to the present application. Thus, claims 1-15 and 21-32 are pending in the present application. No new matter has been introduced by way of the present amendment. Reconsideration of the present application is respectfully requested.

In the Office Action, claims 1-5, 9-18 and 21-23 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Chan (U.S. Patent No. 6,252,). Claims 6-8, 19, 20 and 24 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Chan in view of Gardner (U.S. Patent No. 6,355,955). Applicants respectfully traverse the Examiner's rejections.

As the Examiner well knows, an anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). To the extent the Examiner relies on principles of inherency in making the anticipation rejections in the Office Action, inherency requires that the asserted proposition necessarily flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1463-64 (Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d 1788, 1789 (Bd. Pat. App. & Int. 1987); *In re King*, 231 U.S.P.Q. 136, 138 (Fed. Cir. 1986). It is not enough that a reference could have, should have, or would have been used as the claimed invention. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Oelrich*, at 326, quoting *Hansgirg v. Kemmer*, 40 U.S.P.Q. 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; see also *Skinner*, at 1789. "Inherency ... may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a

given set of circumstances is not sufficient.” *Skinner*, at 1789, citing *Oelrich*. Where anticipation is found through inherency, the Office’s burden of establishing *prima facie* anticipation includes the burden of providing “...some evidence or scientific reasoning to establish the reasonableness of the examiner’s belief that the functional limitation is an inherent characteristic of the prior art.” *Skinner* at 1789.

Moreover, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. Moreover, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); M.P.E.P. § 2143.03.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Health-care Corp.*, 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the

desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. The consistent criterion for determining obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); M.P.E.P. § 2142.

Pursuant to the present amendment, independent claim 1 has been amended to recite, among other things, that the drain and source regions are formed adjacent the implantation mask, that the implantation mask is removed to expose a top surface of the crystalline semiconductor region and that the gate insulation layer is formed on the exposed surface of the top surface of the crystalline semiconductor region. As thus amended, it is respectfully submitted that independent claim 1 is allowable over the art of record.

In the Office Action, the Examiner asserted that Chan disclosed "forming a drain region and a source region (39) using said implantation mask (column 5, lines 7-17), said drain and source regions each having a top surface located above a surface of said crystalline semiconductor region (figure 4E)." Office Action, p. 2. Applicants respectfully disagree with this reading of Chan. The implantation mask identified by the Examiner, *i.e.*, layers 32 and 37, are removed prior to performing the epitaxial growth process that is performed to form the source/drain elements 39. Col. 4, l. 67 – Col. 5, l. 17. It is clear from the express disclosure of Chan that Figure 4D depicts the layers 32 and 37 as having been removed from above the top surface of the substrate. As stated by Chan, this is required such that the epitaxial silicon may be selectively grown over the exposed silicon regions 38. Col. 5, ll. 7-8. Thus, it is unclear where

in Chan the Examiner finds support for the above-referenced statement in the Office Action that the drain and source regions 39 in Chan are formed using the implantation mask, as the implantation mask identified by the Examiner (layers 32, 37) are removed prior to the process that is performed to form the epitaxial regions that ultimately become the source/drain regions 39 in the device disclosed therein.

In any event, claim 1 has been amended to specifically recite that the drain and source regions are formed adjacent the implantation mask, thereby further distinguishing independent claim 1 from the art of record. Since the implantation mask identified by the Examiner does not exist at the time the drain and source regions are formed, Chan, by definition, cannot disclose forming a drain region and a source region adjacent the implantation mask as now set forth in amended independent claim 1.

Moreover, independent claim 1 has been amended to recite that it is a top surface of the crystalline semiconductor region that is exposed when the implantation mask is removed and that the gate insulation layer is formed on the exposed surface area of the top surface of the crystalline semiconductor region. In Chan, the gate insulation layer, *i.e.*, the gate oxide 44, is formed on the exposed silicon surface within the trench 36, *i.e.*, on the exposed bottom surface of the trench 36. Thus, amended claim 1 is different from Chan in at least this additional respect.

In view of the foregoing, it is respectfully submitted that amended independent claim 1, and all claims depending therefrom, are not anticipated by Chan.

Moreover, it is respectfully submitted that amended independent claim, and all claims depending therefrom, are not obvious in view of the prior art of record. More specifically, as indicated above, Chan does not disclose many of the limitations now set forth in amended independent claim 1. In the Office Action, Gardner was cited for allegedly disclosing various

aspects of an anneal process that may be performed. However, Gardner does not cure the fundamental deficiencies pointed out above with respect to Chan as it relates to amended independent claim 1. Thus, even if Chan and Gardner were combined, such a combination of prior art would not disclose each and every limitation of the claimed invention. Accordingly, any obviousness rejection based upon such a combination of prior art would be legally improper. Moreover, there is no suggestion in the art of record to modify the prior art so as to arrive at Applicants' claimed invention. A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35. It is respectfully submitted that any attempt to assert that amended independent claim 1 would be obvious in view of the combination of Chan and Gardner would necessarily be based upon an improper use of hindsight using Applicants' disclosure as a roadmap. Accordingly, it is respectfully submitted that independent claim 1, and all claims depending therefrom, are in condition for immediate allowance.

Pursuant to the present amendment, independent device claim 22 has been amended to further distinguish the claimed invention from the prior art of record. Specifically, independent claim 22 has been amended to recite that the drain and source regions are formed on the top surface of the semiconductor region, that the gate electrode is formed above the top surface of the semiconductor region and that the gate electrode is separated from the top surface of the semiconductor region by a gate insulation layer. As thus amended, it is respectfully submitted that Chan does not disclose or suggest the invention set forth in amended independent claim 22.

As set forth above, the gate electrode 47 disclosed in Chan is not formed above a top surface of the semiconductor region nor is it separated from the top surface of the semiconductor region by a gate insulation layer. Accordingly, it is respectfully submitted that the anticipation rejection of independent claim 22, and all claims depending therefrom, should be withdrawn.

Again, there does not appear to be any suggestion in the art of record for the structure now set forth in amended independent claim 22. Accordingly, independent claim 22, and all claims depending therefrom, would not be obvious in view of the art of record.

New claims 25-32 have been added to further define Applicants' invention. New independent claim 25 recites forming a recess in a semiconductor layer, forming an implantation mask in at least the recess, forming a drain region and a source region by performing at least one ion implantation process to implant ions into the semiconductor layer adjacent the implantation mask, wherein the implantation mask substantially prevents ions from penetrating the bottom surface of the recess, removing the implantation mask to expose the bottom surface of the recess, forming a gate insulation layer on the exposed bottom surface of the recess, forming a gate electrode on the gate insulation layer and doping the gate electrode. It is respectfully submitted that new independent claim 25, and all claims depending therefrom, are likewise allowable over the art of record.

Among other things, new independent claim 25 recites the step of forming a drain region and a source region by performing at least one ion implantation process to implant ions into the semiconductor layer adjacent the implantation mask. As set forth above, the implantation mask identified by the Examiner (layers 32 and 37) in Chan are removed prior to any steps that are performed to form the source/drain regions described therein. For at least this reason, it is respectfully submitted that the prior art of record neither anticipates nor renders obvious the

invention defined by new independent claim 25. Accordingly, it is respectfully submitted that new claims 25-32 are likewise allowable over the art of record.

In view of the foregoing, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the undersigned attorney at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

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